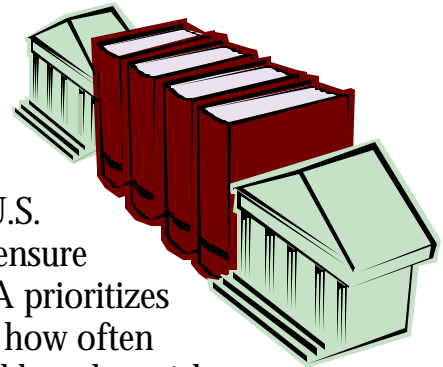


Chapter 3

Overview of Drinking Water Regulations

3.1. Federal Drinking Water Regulations

The United States Environmental Protection Agency (U.S. EPA) sets national standards for tap water, which help ensure consistent quality in our nation's water supply. U.S. EPA prioritizes contaminants for potential regulation based on risk and how often they occur in water supplies. U.S. EPA sets a health goal based on risk (including risks to the most sensitive people, e.g., infants, children, pregnant women, the elderly, and the immuno-compromised). U.S. EPA then sets a legal limit for the contaminant in drinking water or a required treatment technique as close to the health goal as feasible.



U.S. EPA sets primary drinking water standards through a three-step process:

- First, U.S. EPA identifies contaminants that occur in drinking water and may adversely affect public health and with a frequency and at levels that pose a threat to public health.
- Second, U.S. EPA determines a maximum contaminant level goal for contaminants it decides to regulate. This goal is the level of a contaminant in drinking water below which there is no known or expected risk to health. These goals allow for a margin of safety.
- Third, U.S. EPA specifies a maximum contaminant level, the maximum permissible level of a contaminant in drinking water, which is delivered to any user of a public water system. These levels are enforceable standards, and are set as close to the goals as feasible. When it is not economically or technically feasible to set a maximum level, or when there is no reliable or economic method to detect contaminants in the water, U.S. EPA instead sets a required treatment technique that specifies a way to treat the water to remove contaminants.

U.S. EPA, the states (including territories) and water systems all have a role in monitoring and assuring drinking water quality. The Safe Drinking Water Act (SDWA) requires U.S. EPA to set drinking water standards that public water systems (providing drinking water to the public) must follow. U.S. EPA has set standards for 90 contaminants, seven of which are standards that became enforceable January 1, 2002.

Under the SDWA, states that meet certain requirements, including setting regulations that are at least as stringent as U.S. EPA's, may apply for, and receive primary enforcement authority, or primacy. All states and territories, except Wyoming and the District of Columbia, have received primacy. While no Indian tribe had yet applied for and received primacy as of mid-2003, four tribes currently receive treatment as a state status, and are eligible for primacy.

Public water systems are responsible for complying with all regulations, including monitoring, reporting, performing treatment techniques, record keeping, and public notice requirements. States, in turn, keep the data for systems in the files in state data systems. States report violations of Maximum Contaminant Levels and treatment techniques, as well as monitoring violations, to U.S. EPA. Indiana reports its violations to U.S. EPA Region 5 in Chicago.

States and U.S. EPA engage in a variety of activities to help water systems remain in, or return to, compliance including visiting water systems and reviewing their facilities, equipment, and operations; helping systems invest in preventive measures; providing financial assistance for system improvements; lending specialized monitoring equipment; conducting training sessions; holding public information meetings; reminding systems of monitoring requirements; and publishing newsletters and bulletins.

States and U.S. EPA maintain a formal enforcement program to ensure that violations are promptly addressed and that public health is protected. As a condition of primacy, states are required to have formal enforcement authority.

The 1996 SDWA amendments require that primacy states have administrative penalty authority. In taking enforcement actions, states and U.S. EPA generally follow an enforcement management system or policy. The first response to a violation is generally an informal action (e.g., technical assistance or reminder letter). When a Public Water Supply (PWS) does not return to compliance or incurs additional violations, formal enforcement action should be initiated.

When violations pose an immediate risk to public health, states or U.S. EPA often proceed directly to a formal action. There are many types of formal enforcement actions. Administrative orders, either with or without penalty, are issued by an executive agency of the state or federal government. Judicial actions include civil and criminal court cases.

3.1.1. Safe Drinking Water Act

Congress originally passed the SDWA in 1974 to protect public health by regulating the nation's public drinking water supplies. The law was amended in 1986, 1996 and 2002 and requires many actions to protect drinking water and its sources. The SDWA does not regulate private wells that serve fewer than 25 individuals.

The SDWA applies to every PWS in the United States. There are currently more than 170,000 PWSs providing water to almost all Americans at some time in their lives.

Essential components of the SDWA include protection and prevention. States and water suppliers must conduct assessments of water sources to see where they may be vulnerable to contamination. Water systems may also voluntarily adopt programs to protect their watershed or wellhead and states can use legal authorities from other laws to prevent pollution.

The SDWA mandates that states have programs to certify water system operators and make sure that new water systems have the technical, financial, and managerial capacity to provide safe drinking water. The SDWA also sets a framework for the Underground Injection Control (UIC) program to control the injection of wastes into ground water. U.S. EPA and states implement the UIC program, which sets standards for safe waste injection practices and bans certain types of injection altogether. All of these programs help prevent the contamination of drinking water.

National Secondary Drinking Water Regulations (NSDWRs or secondary standards) are non-enforceable guidelines concerning contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. U.S. EPA recommends secondary standards to water systems but does not require systems to comply. However, states may choose to adopt them as enforceable standards.

3.2 Indiana Drinking Water Regulations

There are approximately 4,600 PWSs in Indiana serving over 8 million people. Indiana is in U.S. EPA Region 5, which also includes Illinois, Michigan, Minnesota, Ohio, and Wisconsin. The Indiana Department of Environmental Management (IDEM) has primary enforcement authority for all of the public water systems in the State.

Drinking water standards apply to all public water systems that provide water to at least 15 connections or 25 persons at least 60 days out of the year (most cities and towns, schools, businesses, campgrounds, and shopping malls are served by a PWS). Drinking water standards apply to water systems based on their size and type:

- Community Water System - a PWS that serves the same people year-round. Most residences including homes, apartments, and condominiums in cities, small towns, and mobile home parks are served by Community Water Systems.
- Noncommunity Water System - a PWS that serves the public, but does not serve the same people year-round. There are two types of Noncommunity Water Systems:
 - Nontransient Noncommunity Water System - a water system that serves the same people more than six months per year, but not year-round; for example, a school with its own water supply is considered a nontransient system.
 - Transient Noncommunity water system - a water system that serves the public but not the same individuals for more than six months; for example, a rest area or campground may be considered a transient water system.

3.2.1. Construction Permits

A water system must obtain a construction permit from IDEM prior to beginning construction on new treatment plants, water storage tanks, booster stations, wells, chemical feeders or water main extensions.

All plans and specification are to be prepared by a Professional Engineer and Submitted to the Permit Section of IDEM's Drinking Water Branch.

A Notice of Intent to Construct a Water Main must be included if applicable. Parties potentially affected by the construction of a water system must be notified by direct mail and/or newspaper advertisement.

3.2.1.1. New Water Supplies

Prior to applying for a construction permit, a new community or new nontransient noncommunity water supply must demonstrate it has the technical, managerial and financial capacity to achieve and maintain compliance with the rules for operation of a water supply. A written water system management plan will be required as part of the application.

3.2.1.2. Water Main Extensions

Systems must maintain control over any proposed main extensions. A thorough plan review process is necessary to assure that there is adequate pressure for both domestic use and fire protection. According to Recommended Standards For Water Works (Ten State Standards):

Plan review process should also evaluate:

- 1) material selection
- 2) size of pipe (minimum diameter of 6" for fire protection line with hydrant)
- 3) placement and depth of pipe
- 4) location of valves, hydrants, etc. (include maximum distance between valves and between hydrants)

- Avoid dead end mains where possible; provide flushing hydrant at end of all mains.
- Protect against corrosion, both internal and external.
- Minimize lead in pipes and fittings (should not contain more than 8% lead).
- Refer to AWWA Standard (C600) for pipe laying. It has detailed information on materials, installation, and testing procedures.

3.2.2. Sanitary Surveys (Systems < 10,000)

All systems are required to have periodic sanitary surveys. Sanitary surveys are conducted by the IDEM to inspect the water source, facilities, equipment, wellhead protection information and other important aspects of your system. This inspection is used to evaluate the adequacy of the system components, review current monitoring requirements and determine what if any measures are needed to improve water quality.

Surveys are required to be completed every five years at a minimum for community and noncommunity groundwater systems, and every three years for surface water systems. Sanitary surveys may also be conducted during routine or periodic inspections due to maximum contaminant level exceedances, if there is a disease outbreak, or at the discretion of the IDEM.

Sanitary surveys must be performed by the commissioner or an agent approved by the commissioner. The public water system must ensure that the sanitary survey takes place.

3.2.3. Cross Connection Control

Cross connection control requirements are listed in Title 327 of the Indiana Administrative Code (327 IAC 8 Rule 10). The referenced material is too long for this manual, but the definitions are shown below.

Water systems are required to collect inspection results. This implies that the initial cross connection inspection of customer facilities is the responsibility of the public water system.

Operators should be aware of the difference between a cross connection and backflow. Backflow is defined as the flow of water or contaminants into the public water supply distribution system from a source other than the public water supply.

Two acts are necessary for backflow to occur. There must be a link between potable water and another source. This physical arrangement is called a cross connection. There must also be a pressure difference between the two sources. Since water follows the path of least resistance, it will always flow from a higher to a lower pressure. Therefore, a decrease in system pressure or an increase in pressure from the customer side could cause backflow.

Installation of a backflow prevention device at the water meter will reduce water pressure and will change the hydraulics of the customer's water system. The check valves in a backflow preventer will close the system. Since water is unable to flow back into the distribution system, thermal expansion becomes a potentially dangerous problem. A relief valve or an expansion chamber is necessary to limit thermal expansion of heated water.

There are different backflow prevention devices based on the degree of hazard to the water supply. Reduced pressure principle device, double check assembly, and pressure vacuum breaker are examples. The reduced pressure and pressure vacuum breaker require testing every six months. The double check must be tested every twelve months. Testing must be done by state certified cross connection control inspectors.

3.2.4. Consumer Confidence Reports

This requirement of the SDWA provides that all community water systems shall deliver to its customers an annual report. These reports must contain information on the quality of the water delivered by the system and characterize the risks, if any, from exposure to contaminants detected in the drinking water in an accurate and understandable manner.

Systems shall deliver their reports no later than July 1 annually. Each report must contain information concerning testing results collected during, or prior to, the previous calendar year.

A community water system that sells water to another community water system shall deliver the applicable information noted above to the buyer system no later than April 1 annually.

Detailed requirements for this regulation can be obtained from the IDEM Drinking Water Compliance Section.

3.2.5 Operator Certification

The SDWA gives states flexibility in implementing drinking water protection efforts so that they can meet the specific needs of their citizens while maintaining an Operator Certification Program: The SDWA established new requirements for certification of the people that operate public water systems. To meet the new requirements, states must have submitted their current certification programs to U.S. EPA by August 2000 or submitted revised program changes to U.S. EPA by February 2001. States must include ongoing stakeholder involvement in the revision of operator certification programs, and U.S. EPA's guidelines strongly recommend that states use stakeholder boards or advisory committees to help implement these programs.

According to Rule 327 IAC 8-12 all community water supplies in Indiana must be operated by an Indiana Department of Environmental Management (IDEM) certified water treatment plant operator. The grade of certification required depends on the treatment process(es) used at the water treatment facility and the distribution system size and type. If there is not a certified operator on a water utility's staff, then the services of a certified operator must be secured to make the operating decisions and sign required IDEM paperwork. As treatment processes change, the required operator certification also changes. All potential certified operators must have a minimum amount of experience before taking a certification test.

Operator certification is vital to the safe operation of a water utility. Many times water utility operators have diverse backgrounds and a standardized operator test is an effective way to ensure capable and safe water utility operation. It is important that all water utility operators understand the scientific principles that relate to the operation of their water treatment plant.

A certified operator is required to obtain a certain amount of continuing education units (C.E.U.s). This practice will keep an operator exposed to new technologies, idea sharing forums, and new regulations. A total of 90% of the C.E.U.s must be obtained through technical training. As a part of an operator certification program, a membership in one of several water utility professional organizations is encouraged. These organizations also provide the opportunity to obtain C.E.U.s.

Some water industry organizations sponsor a review course for water utility personnel taking certification examinations. A summary of the topics covered in a water certification review course follows.

Water supply hydrology	Groundwater sources	Surface water sources	Emergency and alternative water sources
Use and conservation of water	Water quality	Source water protection	Public water supply regulations
Water quality monitoring	Water laboratory equipment and instruments	Physical tests (pH, hardness, alkalinity)	Inorganic chemicals
Organic chemicals	Radiological contaminants	Customer complaint investigation	Water treatment processes
Treatment of water at the source	Preliminary treatment (screens, presedimentation basins)	Coagulation and flocculation	Sedimentation basins and clarifiers
Filtration (types, back washing, regulations, operating problems)	Disinfection	Fluoridation	Corrosion control and scaling
Iron and manganese control	Lime softening	Ion exchange	Adsorption
Aeration	Membrane processes	Water treatment plant instrumentation and control	Distribution system design
Piping materials	Valves	Water main installation	Backfilling, main testing, and installation safety
Fire Hydrants	Water Storage	Distribution system operation and maintenance	Water service connections
Water meters	Cross connection control	Pumps, motors, and engines	Public relations

3.2.6. Public Notification

Public notification is the process used by water systems to notify their customers, guests and employees when the water systems have violated a drinking water regulation. Public notification is required by law whenever a water system exceeds a maximum contaminant level or fails to monitor for specified contaminants.

There three levels of notification:

1. Immediate Notice (Tier 1): Any time a situation occurs where there is the potential for human health to be immediately impacted, water suppliers have 24 hours to notify people who may drink the water of the situation.
2. Notice as soon as possible (Tier 2): Any time a water system provides water with levels of a contaminant that exceed EPA or state standards or that hasn't been treated properly, but that doesn't pose an immediate risk to human health, the water system must notify its customers as soon as possible, but within 30 days of the violation. Notice may be provided via the media, posting, or through the mail.
3. Annual Notice (Tier 3): When water systems violate a drinking water standard that does not have a direct impact on human health (for example, failing to take a required sample on time) the water supplier has up to a year to provide a notice of this situation to its customers. The extra time gives water suppliers the opportunity to consolidate these notices and send them with annual water quality reports (consumer confidence reports).

IDEM's Drinking Water Compliance Section can provide copies of example public notifications. Please see Appendix 2 for a fact sheet about public notification. Also, please see Appendix 5 for an Internet link to computer templates for public notification.

3.2.7. Wellhead Protection

A Wellhead Protection Area (WHPA) is defined as the land surface and subsurface area surrounding a wellfield through which water, or contaminants, can enter the ground and move toward the wellfield within a specified time period. WHPA delineation provides a reasonable assessment of the time-related groundwater capture zones for a well or wellfield.

The 1996 Amendments to the Safe Drinking Water Act (SDWA) took a major new step in drinking water protection by mandating that states perform a source water assessment for each public water system, i.e., WHPA delineation. The source water assessment programs established by each state differ, depending on the nature and threats to the water resources and the drinking water program priorities in a particular state.

Each assessment program must include four major elements: delineating the source water protection areas, conducting an inventory of significant potential sources of contamination in those areas, determining the susceptibility of public water systems to those contamination sources, and releasing the results of the determinations to the public. Following successful completion of these elements for each assessment, communities can use the resulting information to identify priority actions for protecting their drinking water sources.

Effective March 28, 1997, Indiana Administrative Code (327 IAC 8-4.1) established a requirement for Wellhead Protection for all Community Public Water Supply Systems (CPWSS) operating in Indiana. The rule establishes enforceable language in order that community public drinking water supplies be protected from foreseeable contamination. There are two phases of Indiana's Wellhead Protection Rule. Both phases have seven steps and varying Wellhead Protection Program plan submittal deadlines, depending upon the population served by the water system.

Phase I of Indiana's Wellhead Protection Rule requires public water systems to submit a written Wellhead Protection Program to the Indiana Department of Environmental Management by March 28, 2000 (population served at or greater than 50,001), or March 28, 2001 (population served 3,301-50,000), or March 28, 2002 (population served less than 3,301). All systems that begin operations after March 28, 2002 are required to complete wellhead protection.

Phase II of Indiana's Wellhead Protection Rule requires public water systems to submit written updates of their Wellhead Protection Program to the Indiana Department of Environmental Management no later than 10 years following Phase I approval (population served less than 3,301), no later than 7 years (population served 3,301-50,000) or no later than 5 years (population served at or greater than 50,001).

The following table illustrates these requirements:

		Phase I		Phase II
Public Water System Size (population served)	Submittal Deadline	Submittal Requirements	Submittal Time from Phase I Approval (in years)	Submittal and Update Requirements
Large ≥50,001	March 2000	Names, roles & affiliation of the local planning team members WHPA delineation, including: A. Summary of geologic and hydrologic conditions of the WHPA B. Model input data C. Justification of model choice Potential sources of contamination inventory Management strategy with schedule for implementation Contingency plan Description of public participation Description of public education program	5	Comprehensive WHPP Updated schedule of implementation Updated WHPA, considering new data if any Updated potential sources of contamination inventory Report of any problems or concerns regarding WHPP Contingency plan revisions (if needed) Documentation to confirm: A. Sanitary Setback Area meets requirements B. Abandoned wells are identified C. Wellhead is secured from unauthorized access. D. All potential sources of contamination within the WHPA are managed E. Signs are posted at WHPA perimeter F. Public education is ongoing G. Any new ground water contamination within the WHPA is reported
Medium 3,301 to 50,000	March 2001		7	
Small ≤ 3,300	March 2002		10	

Many WHPAs will include multiple jurisdictions, i.e., the city or county where the wellhead is located, and other towns, counties, or states up-gradient from the public water system.

Local political authorities may be able to adopt protection measures within their jurisdiction, but to achieve effective protection beyond their boundaries, they will usually have to work with neighboring jurisdictions.

Communities use a wide array of different source water protection methods to prevent contamination of their drinking water supplies. One management option involves regulations, such as prohibiting or restricting land uses that may release contaminants in critical source water protection areas.

Along with regulations, many communities hold local events and distribute information to educate and encourage citizens and businesses to recycle used oil, limit their use of pesticides, participate in watershed cleanup activities, and participate in a multitude of other prevention activities.

Another aspect of a source water protection program can be the purchase of land or the creation of conservation easements to serve as a protection zone near the drinking water source. For an effective protection program, communities should consider using a variety of prevention measures.